

One Year After the Gold King Mine Incident:

A Retrospective of EPA's Efforts

To Restore and Protect Impacted Communities



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EXECUTIVE SUMMARY

On August 5, 2015, an EPA team was investigating Gold King Mine as a source of acid mine drainage in the ongoing effort to reduce metals loadings into the Animas Watershed, located near Silverton, Colorado. Beginning in the 1880s, this area was home to many mines extracting gold, silver, lead and copper until operations ceased in the early 1990s. During the investigation, the EPA Team inadvertently triggered a release from GKM of three million gallons of acidic, metal-laden waters. These waters had been trapped by collapsed mine ruins blocking the opening (or adit) of the mine, causing the waters to become pressurized. As the plume from the release flowed down the Animas River to the confluence with the San Juan River over an eight day period, water quality soon returned to pre-event conditions.

Following the release, EPA initiated notification to four states (Colorado, New Mexico, Arizona and Utah) and three tribes (Navajo Nation, Southern Ute, and Ute Mountain Ute. While the release was later determined to be equivalent to four days of normal acid mine drainage from this historical mining area, EPA took precautions to ensure that all affected localities had sufficient data to inform decisions regarding ongoing agricultural and recreational use of these waters. Except for the Navajo Nation, all areas lifted drinking water limitations within 10 days and remaining recreational limitations were lifted shortly thereafter.

EPA has dedicated more than \$29M to respond to the release and to provide for continued monitoring in the area. The majority of the funds are being used to stabilize the mine adit and mitigate ongoing acid mine drainage. Reimbursement of state, local and tribal response costs from the incident is also in process, with nearly \$1.7M provided to our partners to date. EPA is evaluating additional incident-related expenses requested and will expedite distributing these funds. EPA is also providing more than \$2M to empower states and tribes to establish their own real-time data monitoring of water resources and to improve the notification process for any future incidents.

Contamination from more than 160,000 abandoned mines in the West continues to pose a costly and complex challenge. EPA will continue to collaborate with our partners on the best practices and lessons learned from this event to address the legacy of abandoned mines. For communities impacted by the decades of contaminated mine drainage into the Animas and San Juan Rivers, EPA has proposed a National Priorities Listing for the Bonita Peak Mining District (which includes Gold King Mine) and is committed to pursue collaborative approaches to improve water quality impacted by pollution that crosses state and tribal borders. One year after the Gold King Mine incident, we continue to work together to achieve permanent solutions to prevent future releases and protect our vital water resources.

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Introduction

This report provides an overview of the EPA response to the unexpected release of pressurized metal-laden water from the Gold King Mine on August 5, 2015, including information on the environmental conditions of the watershed prior to and after the incident. Water in the West is a scarce and precious natural resource. EPA recognizes the impact that the Gold King Mine release had on the people of the Four Corners Region. The Agency has worked with affected residents, small businesses, universities, local governments, states and tribes in an extensive effort to assess and address the immediate and potential long-term impacts of the release on water quality in a region adversely impacted by a legacy of contaminated acid mine discharge (AMD) from abandoned and unstable hardrock mines. In responding to this unfortunate incident, which resulted in the release of approximately three million gallons of contaminated water, EPA has dedicated more than \$29 million for a wide range of federal, state, tribal and local response and monitoring actions. EPA's actions include efforts to address the immediate impacts, and to engage stakeholders in the process of seeking longer-term actions and improving EPA's review, notification and response systems.

Historical Perspective

Water Contamination Resulting from Historic Mining in the West is Extensive and Ongoing

Mining in the Western United States began at a time when there was little understanding of the environmental impacts of mining. During the late 1800's through the early 1900's, mine waste often directly discharged into rivers and streams. Today, abandoned and inactive hardrock mines pose a serious safety and environmental problem. While there is no current and comprehensive inventory of abandoned hardrock mines in the United States, a 2015 [[HYPERLINK "http://www.gao.gov/products/GAO-15-812"](http://www.gao.gov/products/GAO-15-812)] estimates at least 161,000 such mines exist in the 12 western states and Alaska, and at least 33,000 of these mines had degraded the environment by contaminating surface water and groundwater.

Long-term environmental impacts of hard rock mining result primarily from water reacting with iron disulfide (pyrite) and oxygen to form sulfuric acid (acid rock/mine drainage). The resulting acidic water dissolves naturally

occurring heavy metals such as zinc, lead, cadmium, copper and aluminum. Water containing these metals flow out of mine adits (openings used for access or drainage) or emanate from interactions with surface waste features such as waste rock piles and tailings. When this water contacts water in river systems and is diluted, the dissolved metals that were suspended precipitate out and are deposited in river sediments that can be disturbed and resuspended during seasonal runoff and extreme weather conditions. In addition, erosion of soil and other materials carrying metals in particulate form contribute to sediment contamination. As the majority of these abandoned mine sites have not been operated or maintained in many decades, they may also pose significant structural stability challenges including collapsed underground mine adits and failing impoundments or tailings dams.

While there are no overarching federal statutes or regulations for addressing the environmental contamination from abandoned hardrock mines, EPA's Superfund program has been used to investigate and remediate abandoned mines when requested by state or tribal partners. Adding a site to the Superfund National Priorities List (NPL) allows access to the Superfund, the EPA-administered public fund for remediating contaminated sites. There are more than 500 such sites identified in the Superfund database and more than 130 considered for designation on the NPL. Hardrock mining and mineral processing sites are both technically complex and costly to clean up, and tend to be much larger sites ranging from hundreds of acres to hundreds of square miles. The metal-laden waters released from these sites often require long-term water treatment, which further lengthens the time and cost of cleanup. GAO estimates that EPA spends anywhere from 7 to 52 times more at mining sites than at other types of Superfund sites.

The significant impacts on water quality and the environment from AMD associated with abandoned hardrock mines have been recognized for many years. Beginning in fiscal year 2012 and continuing through the fiscal year 2017 budget request, President Obama has requested that Congress take action to enact legislation to provide funding for cleaning up the many thousands of abandoned hardrock mines that are contaminating American waterways. The President's proposal would levy a cleanup fee on the hardrock mining industry for public minerals similar to the royalties paid by the oil and gas industry and the abandoned mine reclamation fee paid by the coal industry. To date, Congress has not acted on the President's request.

In Colorado alone, there are an estimated 23,000 former mines, 6,127 of which have been addressed by the Colorado Division of Reclamation, Mining and Safety (DRMS). Located within the watersheds of the San Juan Mountains in southwestern Colorado are some 400 abandoned and inactive mines which operated between 1871 and 1991. [INSERT: Map of Basin, p.3 ORD] The Gold King Mine (GKM), located in the Upper Animas Watershed, discharges an estimated 690,000 gallons per day. Combined with 32 other mines contributing 5.4 million gallons per day, the Upper Animas Watershed has historically received high concentrations of heavy metals (such as zinc, lead, cadmium, copper and aluminum) from acid mine drainage from mining operations and from naturally occurring metal loadings from highly mineralized rock formations. Naturally-occurring drainage left many creeks in the Animas Watershed biologically dead

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prior to the start of mining activities according to historical accounts from early prospectors in the mining district. Historical practices of discharging mine waste directly into the creeks, combined with natural loadings, prompted the City of Durango to seek an alternative to the Animas River as a water supply in 1902. The U.S. Department of the Interior estimates that over the period of active mining within the Watershed, mines have created more than 8 million tons of mine tailings.

Although GKM ceased operations in 1922, the mine ruins and waste materials from the mine have continued to discharge into the watershed since that time, comingling with other discharges from surrounding mines throughout the watershed. DRMS took action to address mine drainage into the Upper Animas by issuing a permit in 1986 for work on the GKM site adits. In 1991, the last commercial mine in the region, the Sunnyside Mine, stopped operating and the owner took action under an agreement with Colorado to install three mine bulkheads (plugs) in the American Tunnel (which served to drain the GKM and Red and Bonita Mine) and to install a water treatment plant. After the plugging, the water flow out of the Gold King, Red and Bonita and other mines increased substantially. Subsequently, the Gold King Corporation, which took over the water treatment operations, experienced financial issues, and the treatment plant stopped operating in mid-2004. DRMS took efforts to prevent additional water from pooling behind Gold King adit blockages and developed a Gold King Mine Reclamation Plan in 2009 to address the increased water level and pressure. Based upon 2009-2014 flow data, the average annual water discharge from the Gold King Mine and three nearby mines reached approximately 330 million gallons per year.

For decades, stretches of the Upper Animas River and its tributaries have not supported healthy communities of fish and other aquatic life. Since 1998, Colorado has designated portions of the Animas River downstream from Cement Creek as impaired for certain heavy metals, including lead, iron and aluminum. Colorado had developed numerous water quality cleanup plans under the federal Clean Water Act to address mining contaminants. Numerous projects had been implemented to control “nonpoint sources” of mining waste with funding provided under EPA’s nonpoint source control grant program under Section 319 of the Clean Water Act. Similarly, the Navajo Nation has identified portions of the Lower and Middle San Juan River Watershed as not supporting the uses designated in their EPA-approved water quality standards based on data collected in 2012-2013 for a variety of pollutants, including arsenic, lead, and zinc.

In the 1990s, EPA and Colorado jointly conducted a Site Assessment of mines within the Cement Creek watershed for possible designation on the NPL. In recognition of a community-based collaborative effort to take responsibility for improving water quality in the Animas River rather than seek federal Superfund designation, EPA did not pursue the addition of the area to the NPL. Sampling showed that until approximately 2005, water quality in the Animas River was improving. In 2004-2005, however, water quality began to decline. This time period coincides with the cessation of operations at the water treatment plant treating the discharge from the American Tunnel. Impacts to

aquatic life were demonstrated through fish population surveys, which found no fish in a two-mile stretch of Cement Creek south of Gladstone and significant declines as far as 20 miles downstream.

EPA continued working with Colorado and the Animas River Stakeholder Group (ARSG) to broaden its investigations of conditions in the area in order to understand the major sources of heavy metal contamination in the Upper Animas Watershed. As part of this process, EPA and DRMS investigated and assessed the loading contributed by the Gold King Mine and other nearby mines. By 2014, EPA was working with DRMS to investigate GKM to assess both the potential for a catastrophic release and the ongoing adverse water quality impacts caused by mine discharges. EPA and DRMS sought input throughout their investigation from local governments and community members, coordinated through the ARSG. In September, 2014, excavation was initiated but halted two days later when DRMS and EPA staff observed additional seepage.

Throughout the winter and spring of 2015, EPA and DRMS developed plans which were then presented to ARSG. During the 2014-2015 investigatory process with DRMS, the EPA Team concluded the adit probably was only partially full of water, based on analysis of available information such as flow rate data and information from nearby mines, as well as visual observations of seepage believed to be six feet above the adit floor. After the EPA team determined it was likely not full, they took preliminary actions similar to those implemented successfully at the nearby Red and Bonita Mine prior to reopening its adits. At the Red and Bonita Mine, however, a drill rig was used to bore into the mine from above to directly determine the water level and pressure of the mine pool behind the collapsed adit. While this approach was an option for Gold King, drilling a hole from above raised safety concerns and would have been significantly more difficult due to the steep terrain and the uncertainty of how stable the ground above the adit would be for drilling operations. In combination with the cost, safety and technical complexity associated with drilling, the EPA team decided to proceed with their investigation, taking precautions as if it were pressurized. [Insert Photo of Adit with Steep gulch]

Release and Response

During Efforts to Investigate Contributions of Acid Mine Drainage from Various Sources to the Animas Watershed, the EPA Team Inadvertently Triggered a Large Release

During the summer 2015 construction season, EPA and DRMS were completing work at the nearby Red and Bonita Mine, with contractor crews and equipment available. In preparation for an August 14, 2015 meeting between EPA, DRMS and the Department of the Interior's Bureau of Reclamation (BOR) to discuss GKM, EPA sought to determine the exact location and condition of the GKM blockage, and the exact location of the bedrock above and around the adit. While the EPA team was excavating above the main Gold King Mine adit on August 5, 2015, pressurized water began leaking from the mine adit. The small leak quickly turned into a significant breach releasing approximately three million

gallons of mine water into the North Fork of Cement Creek, a tributary of the Animas River. This sudden release was roughly equivalent to four days of normal AMD leakage, or one day of high spring runoff from this mine. The mine water flooded the North Fork of Cement Creek, ultimately reaching the Animas and San Juan Rivers.

[Insert series of photos showing plume]

Given the flow of the Animas River into the San Juan River, the release ultimately crossed three states (Colorado, New Mexico and Utah) and three reservations (Southern Ute Indian Tribe, Ute Mountain Ute Tribe and Navajo Nation). EPA deployed federal On-Scene Coordinators and other technical staff to Silverton and Durango to assist with preparations and first response activities. EPA also activated its Emergency Operations Center in Washington, D.C. and established a Unified Command Center in Durango, CO, to help ensure coordination among its three regions, laboratories, and national program offices as well as state, tribal and local partners. [Insert Map ORD p.6]

Following the release an EPA on-scene staffer contacted DRMS staff, who then reported the release to the National Response Center. Colorado officials notified downstream jurisdictions within Colorado in order that local officials could take appropriate action regarding public drinking water intakes and other possible restrictions until the contaminated plume passed. Downstream jurisdictions in New Mexico, Utah and Arizona were notified by EPA, allowing ample time to make decisions on closure of drinking water intakes and management of irrigation diversions in those areas before the plume arrived.

EPA worked closely with federal, tribal, state, and local officials to provide up-to-date information so that local authorities could make decisions on restrictions to be imposed on the uses of the rivers and how to advise the public. While Silverton's public drinking water supply was not affected, waters in nearby Durango were impacted and operators of the Durango Water Treatment Plant closed intakes along the Animas River in advance of the plume. EPA provided alternative drinking water, as well as irrigation water, to users in San Juan and La Plata County, Colorado. Before the plume reached the confluence of the Animas and San Juan Rivers on Saturday, August 8, New Mexico recommended all public water systems shut off intakes and the Navajo Nation issued a Precautionary Notice for drinking, livestock and recreational water uses. EPA supplied agricultural water to Navajo farmers for irrigation purposes and delivered hay to the Navajo Agricultural Products Industry for Navajo ranchers.

Working in conjunction with the Colorado Department of Public Health and the Environment (CDPHE), the New Mexico Environmental Department, and the Utah Department of Environmental Quality (UDEQ), EPA deployed teams to collect water samples as the plume moved through the Animas and San Juan Rivers. Teams sampled surface waters in the Animas and San Juan Rivers as well as groundwater in private wells in Colorado and New Mexico. Working with the Navajo Nation, EPA coordinated sampling activities on the San Juan River and Lake Powell. EPA also collected sediment samples from several points along and in the waterways. The initial results following the release showed spikes in

metals including arsenic, lead, copper, and aluminum. In addition, low pH levels were found indicating elevated levels of acidity in the water coming from the mine.

In the first several days after the incident, EPA deployed more than 210 employees and contract personnel. In addition to daily calls with elected officials and the media, within the first four days EPA attended or held four public meetings in Silverton and Durango, attended by a total of approximately 2,000 people. EPA deployed 30 personnel to deal specifically with impacts to the Navajo Nation, and held public meetings to inform Navajo communities of the release. Over the course of ten days, 1,100 community members were reached at nine public meetings throughout affected Navajo communities. [Insert OSC Photo touring site with tribal partners]

EPA continued to collect samples over varying intervals beginning hourly early in the response to weekly later in the response. The majority of samples taken in the days and months following the release indicated water quality trended to pre-incident conditions, and most localities decided to reopen water intakes and resume recreational and agricultural use of the Animas and San Juan by August 16, 2015. The Navajo Nation lifted irrigation restrictions for three Navajo Nation chapters on August 28, 2015, and lifted agricultural restrictions on the rest of the San Juan River on October 15, 2015. On an ongoing basis during response efforts, EPA provided validated sediment and water sampling data to the public via EPA's Gold King Mine Response page (www.epa.gov/goldkingmine) and the Agency continues to post sampling data and other updates to this site on a regular basis.

By August 10, 2015, EPA finished the construction of a series of settling ponds to treat the metal-laden water discharging from the mine. Lime was added to the ponds to bring the pH of the acidic water to a point where the metals of concern become insoluble and form a sludge which settles in the ponds. To enhance treatment of the continued discharge from the mine, in November 2015, EPA completed installation of a \$1.5 million portable interim water treatment plant in Gladstone, CO – approximately 10 miles north of Silverton. The interim treatment plant is designed to manage up to 1,200 gallons per minute and treat the mine discharge by removing solids and metals. EPA has been sampling and analyzing the untreated (influent) and treated (effluent) mine water at least monthly since the plant was installed to ensure the plant is performing properly. The data indicate that the plant is meeting EPA design and performance expectations and has lessened the risk of downstream impacts of the continuing discharge from the Gold King Mine. [Insert R8 Photo of IWTP]

After soliciting and incorporating feedback from stakeholders, including state, tribal and local partners, in March 2016 EPA released the *Post-Gold King Mine Release Incident: Conceptual Monitoring Plan for Surface Water, Sediments, and Biology*, a final monitoring plan for the Animas and San Juan Rivers. This monitoring plan is designed to gather scientific data to evaluate river conditions over the course of the year and to identify any potential impacts to public health and the environment from the release. Under this plan, EPA is examining water quality, sediment quality,

biological indicators and fish tissue at 30 locations under a variety of flow and seasonal river conditions. EPA continues to work with state, tribe and local partners on additional monitoring, data management and analyses. States and tribes are also designing and implementing their own jurisdiction-specific monitoring and preparedness plans to address their priorities. EPA has made approximately \$2.4 million in funding available to states and tribes for these monitoring efforts, in addition to the normal grants states and tribes received from EPA to support their water quality management programs. EPA is also contributing more than \$600,000 toward a real-time, water-quality monitoring alert system established by states, tribes and local communities.

Environmental Conditions Post-Release

Data indicate the Plume Dispersed Down the Animas River to the San Juan River over a Period of 8 Days, with Dissolved Metals Levels in All Areas Returning to Pre-Incident Conditions Shortly After Passage of the Plume and 90% of the Particulate Load Deposited in the Animas River

EPA scientists analyzed more than 1,000 water quality and hydrologic samples collected during and after the Gold King Mine release to estimate metal concentrations and loadings as the plume flowed from Cement Creek to the Animas and San Juan Rivers. They also reviewed U.S. Geological Survey (USGS) historic studies of acid mine drainage to gain insight into how the rivers behaved from a hydrological perspective and their expected water quality conditions under similar high flow scenarios, allowing for a robust comparison to historic conditions. The results indicate that most of the Gold King Mine water, coupled with erosion from the release, moved quickly through Cement Creek, transporting metals and sediment with it. There were significantly increased metal loads between the mine entrance and the Cement Creek entry into the Animas River. Overall, nearly 500,000 kg of metals were released into the Animas River from Gold King Mine. Approximately 15,000 kg of the total mass was dissolved metals and the rest was in particulate form. Most of the metal mass was carried in the plume of mine water as it travelled over a period of 8 days from the mine entrance through Cement Creek and into the Animas River and to a lesser extent, the San Juan River. [Insert Photo of plume from ORD p.4]

Data indicate that during the plume flow, water quality returned to pre-event conditions shortly after the plume passed and applicable water quality criteria were not exceeded. The dissolved metals increased in Cement Creek but decreased close to pre-event conditions by the time the plume flowed from the Animas to the San Juan River. Data also indicate that the particulate loads from the soil erosion substantially increased in Cement Creek but declined moving downriver as material deposited along the Animas, principally between Silverton and Durango. EPA scientists estimate that approximately 90% of the particulate load was deposited in the Animas River.

The Gold King Mine plume flowed from the Animas into the sediment-rich San Juan River at Farmington, New Mexico where the remaining particulate load mixed with the large existing sediment load in the San Juan River. The San

Juan River background metal mass appears to be strongly related to sediment concentrations and greatly exceeds plume concentrations, with the exception of lead and selenium. Overall metal concentrations in the streambed of the San Juan River are much lower than they are in the Animas River and increase proportionately with flow during storms as the sediments in the San Juan River are readily mobile in high flows. Analysis to date suggests that the Gold King Mine metals probably did not settle in the San Juan until they reached Lake Powell.

Recognizing that the final resting place of metals from acid mine drainage since the mid-1960s is contained in the sediments of Lake Powell, UDEQ examined USGS sediment cores taken in 2010 and 2011 in the San Juan and Escalante River deltas of Lake Powell. They found that concentrations of metals in the USGS cores were generally higher than the surficial sediment samples USGS collected in August and October 2015 from the San Juan River but still within the same order of magnitude. The cores reveal extensive layering, which could signal different storm events in the watershed. UDEQ water samples also indicated that total metal concentrations in the San Juan River were elevated during storms in late fall 2015. None of the data, however, exceeded health screening values for recreational exposures, as developed by the Utah Department of Health (UDOH). UDEQ collected water samples weekly at seven different locations along the San Juan River as well as two tributaries during the months of February, March and the first week of April, 2016. The data were screened against recreational, drinking water, agricultural, and aquatic life criteria. The data show that aluminum exceeded the criteria for aquatic life and total dissolved solids for agriculture but no other exceedances of criteria were identified. Utah's Long-term Monitoring and Assessment Plan for the San Juan River and Lake Powell will continue to evaluate how high flow events affect sediment, groundwater, and surface water quality as well as whether observed metal loads pose a risk to plants, livestock, aquatic life, and/or humans.

The Mountain Studies Institute (MSI), a non-partisan independent research center, connects scientists and stakeholders across the San Juan Mountain region, including a focus on human-caused change in water quality in the San Juan Mountains. Recognizing that metal contamination from natural sources and mine-related sources have negatively impacted water quality of the Animas River for over a hundred years, MSI has compiled water quality data since their initiation in 2002 to 2016. MSI collected 130 water samples from the Animas River from August 6, 2015, to October 26, 2015, and analyzed the samples for 24 different metals and minerals. The [[HYPERLINK "http://www.mountainstudies.org/animasriver/"](http://www.mountainstudies.org/animasriver/)] were consistent with EPA data and showed a spike in total and dissolved concentrations of metals and minerals immediately following the Gold King Mine release.

MSI, in partnership with the City of Durango, continued to collect water quality samples from February, 2016 through early April, 2016, during spring melt to assess possible re-suspension of sediment deposited along the margins of the Animas River banks. They found that metals of concern for human health (arsenic, lead, and mercury) were at levels considered "safe" for human, recreational and agricultural use based on Colorado water quality standards. MSI did detect high levels of certain metals that are important for domestic water supply, such as Manganese, but Durango

does not use the Animas River as a source of drinking water during spring runoff. In addition, MSI found that metals most harmful to aquatic life (copper, zinc, and selenium) were at levels considered “safe” based on Colorado water quality standards. Concentrations of aluminum and iron surpassed Colorado water quality standards to protect aquatic life from persistent, long-term exposure, but similarly high levels of these metals have occurred in the Animas River during spring runoff in previous years as well. MSI will also continue to monitor the water quality of the river throughout 2016.

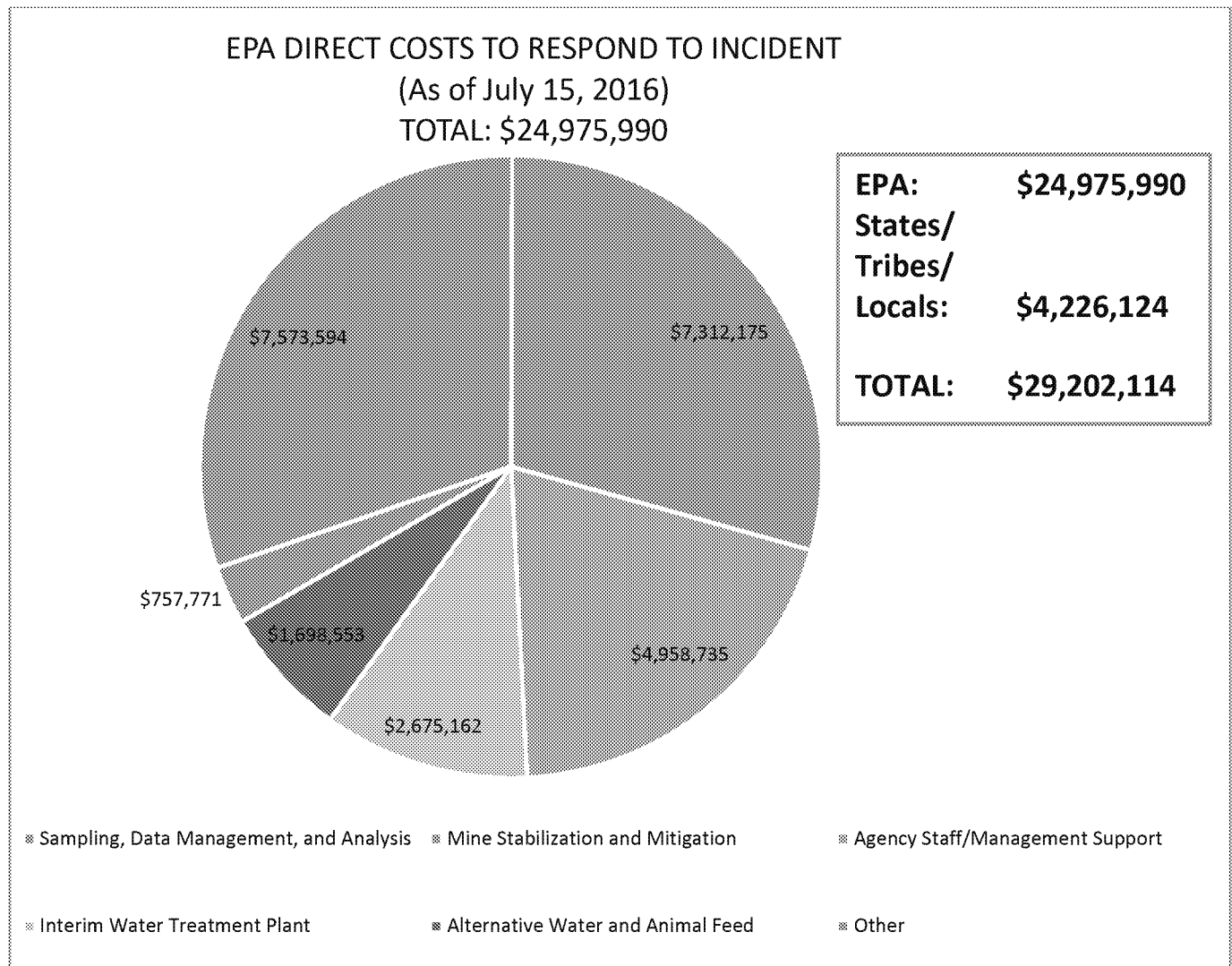
The Release of 3 Million Gallons was Equivalent to 4 days of Typical Acid Mine Drainage and 1 Day of High Spring Runoff

During the annual spring runoff associated with all of the mines in the Animas Watershed, spikes in the dissolved and particulate metals loads are routinely observed and the Animas River is typically colored by iron and aluminum. The release of three million gallons is equivalent to one day of high spring runoff or four days of typical acid mine drainage. Consistent with conditions observed following annual spring runoff, the Animas returned to pre-incident conditions shortly after passage of the plume. With respect to sediments in the San Juan River, the metals load from the release and existing sediment loads are subject to streamflow and high flow events, such as storms. Storms have increased metal loads in the river following historically similar patterns, as observed in the USGS studies in the 1990s. MSI’s recent findings from studies of Animas River aquatic life do not indicate that there were substantial impacts to aquatic communities that signal degrading water quality. They stress that these findings should be viewed in the historical context of metal contamination that has already led to the elimination of species most sensitive to metal contamination. While EPA, states and tribes will continue to assess the potential longer-term impacts of the release, including any metals that may have been deposited in the sediment and may be re-mobilized during heavy rains and spring runoff, it will be difficult to separate GKM from existing and ongoing contamination. [Insert GKM Peak of release flood graphic ORD p.29]

EPA Financial Commitments

EPA Has Dedicated More than \$29M with Majority Spent to Stabilize and Mitigate Drainage

As of July 15, 2016, EPA has dedicated more than \$29 million in response to the Gold King Mine release, including 1) actions taken directly by EPA, 2) reimbursement of state, tribal and local response costs, and 3) grants provided to these entities to support continued monitoring. As part of EPA’s direct response efforts, the Agency performed stabilization and mitigation at the mine, and provided sampling, data management, and analysis and supported personnel deployed to the area. EPA also ensured access to alternate water supply for drinking to livestock and irrigation, and provided hay for animal feed for the Navajo Nation.



Of the \$29M, nearly \$4M of Funding is being Provided to Partners to 1) Reimburse Response Costs and 2) Improve Real-Time Monitoring and Assessment Capability for Localities in Anticipation of Future Spring Runoff Conditions

To further support EPA's partners in their efforts to respond to impacts, EPA has reimbursed approximately \$1.7M in allowable expenses incurred by states, tribes, and local governments. Pursuant to Superfund and Federal grant regulations, EPA is authorized to enter into cooperative agreements to reimburse allowable removal-related activities such as personnel staff time and travel expenses related to responding to the emergency, and contract support for field work including water and soil testing and sample and data analysis. However, some requests cannot appropriately be funded within EPA's Superfund program, such as requests to construct new infrastructure, purchase of new emergency response vehicles not used during the response, hiring new staff, or payment for outside counsel who may have been used to explore pursuing legal action against EPA. Costs for activities which occurred after the conclusion of emergency

response or shutdown and demobilization are not allowable, and expenditures not associated with the emergency response are not allowable. EPA will continue evaluating additional incident-related expenses requested and will expedite distributing these funds as allowed.

EPA is currently in the process of awarding over \$2 million in Clean Water Act grant money to states and tribes to support their ongoing water quality monitoring of the Animas and San Juan Rivers. Additionally the agency is providing \$600,000 specifically to support spring runoff and continuous real-time monitoring efforts. EPA has entered into a cooperative agreement with Colorado to install continuous monitoring equipment (sondes) and conduct sampling at four stations in the Upper Animas. EPA is also working to fund installation of similar sondes and sampling in the Lower Animas and San Juan Rivers. This real-time monitoring will serve to ensure coordination and implementation of notification and preparedness activities for communities downstream. [Insert graphic from p.4 Spring Runoff Preparedness Plan]

EPA is also providing \$100,000 to support projects that provide public education and outreach directly to residents, operators of recreational facilities, and visitors in and around Gladstone and Durango, Colorado to build awareness and understanding of the environment and public health conditions associated with the long-term impacts of mining on the Animas River. There will be a special emphasis on ensuring that residents and visitors understand the water quality conditions in the Animas River including safe recreational river use and providing assistance and technical support to public and private recreational facilities to reduce environmental risks to residents and visitors. To help evaluate emergency contingency water supplies for Navajo farms in northern New Mexico, DOI is providing funding for a study to identify alternative contingency water supplies and operations plans in case the San Juan is temporarily deemed unfit for irrigation in the future.

Moving Forward

EPA maintains accountability for the incident and has distilled important lessons from the incident. EPA will participate fully in any remaining reviews.

Key insights regarding necessary improvements to the practices used in assessing mine contamination and improvements to emergency response actions have been gleaned from both the internal and external reviews of this incident. EPA has implemented many improvements and will continue to take action to improve overall response and timeliness, including better notifications and communications regarding environmental incidents that may affect multiple jurisdictions. With respect to the Gold King Mine release, as detailed in this report, EPA has maintained

accountability for the event and continues on a path of long-term commitment to addressing the environmental impacts of the decades of hardrock mining and mineral processing sites in the area.

Over the course of the past year, EPA, in collaboration with other federal agencies and, state, tribal, and local governments, has engaged directly with residents and other stakeholders affected by the release to minimize the impacts associated not only with this release but with the historical and continuing contributions from legacy mines. There are additional reviews related to the Gold King Mine release underway by the U.S. Government Accountability Office and EPA's Inspector General. The Agency intends to review the results of these reports closely to ensure that additional appropriate recommendations are addressed. The Agency is also working closely with the Department of Justice to evaluate the Federal Tort Claims Act claims that have been filed related to this matter.

EPA is Committed for the Long Term to Improve Real-Time Water Monitoring Capability and Notification for Incidents, Improve Assessment Process for Similarly-Situated Mines, Work with Stakeholders to Pursue NPL Listing for the BPMD, and Address the Environmental Impacts of Legacy Mines

Improved Review, Notification and Response Systems

EPA is taking action to be prepared for any future incidents that have potential multi-state and regional impacts by improving stakeholder notifications and increasing capacity for rapid data collection and dissemination. Contingency Plans will include comprehensive notification contact information in a consistent format with well-developed protocols to provide clear direction and easy access to information in the event of an emergency. Once notified, promptly establishing a flow of information to be released to decision makers and the public is critical. EPA is expanding the use of internal tools to support the use of a consistent database improving data management and the use of a protected and secure website to share critical information in an effort to establish a fluid process of data collection and communication.

Based on recommendations outlined in both EPA's [[HYPERLINK "https://www.epa.gov/goldkingmine/internal-investigation-documents"](https://www.epa.gov/goldkingmine/internal-investigation-documents)] and BOR's October 2015 report, [[HYPERLINK "http://www.usbr.gov/docs/goldkingminereport.pdf"](http://www.usbr.gov/docs/goldkingminereport.pdf)], EPA developed a draft "Best Practices and Approaches Report: Preventing Sudden, Uncontrolled Fluid Mining Waste Releases Prior to Conducting Response Actions at Mine Sites" that compiles best practices and approaches for preventing fluid mine waste releases from collapsed adits and tailings impoundments/dams. This draft report is currently undergoing external review by federal land management agencies, states and tribes.

In advance of the finalization of this report, EPA Assistant Administrator Mathy Stanislaus issued an EPA-wide [[HYPERLINK "https://www.epa.gov/goldkingmine/march-2016-memo-planning-removal-and-remedial-activities-"](https://www.epa.gov/goldkingmine/march-2016-memo-planning-removal-and-remedial-activities-)]

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hardrock-mining-and-mineral"] on March 29, 2016, emphasizing the need to exercise extreme care before conducting field work at hardrock mine sites to minimize the potential for uncontrolled fluid releases. For sites of this nature identified with planned activities during the FY16 construction season, EPA regional offices must consult with EPA Headquarters before initiating action and utilize a checklist to ensure thorough consideration of key issues outlined in the Draft Best Practices and Approaches Report. These considerations include: 1) increased oversight where there is unknown or likely potential for fluid release; 2) creation of a contingency plan for stopping work immediately if problems arise that present a near-term risk; and 3) planned actions to take if an accidental release takes place, including containing and minimizing the release as well as maintaining an up to date notification plan identifying the local, state, and tribal authorities who should be notified as soon as possible in the event of a release. EPA's goal in establishing this consultation process is to ensure that it has the institutional capability to conduct work at mining and mineral processing sites with potential fluid hazards in a way that minimizes, to the extent possible, the risk of a release and adequately provides for contingency plans in the event of an unforeseen fluid release.

NPL Listing

The Gold King Mine is one of 48 mine sites included in the Bonita Peak Mining District (BPMD), which the agency proposed to be added to the NPL on April 7, 2016. NPL listing would make the BPMD eligible for additional study and cleanup resources under EPA's Superfund program. On February 29, 2016, EPA received a letter from Colorado Governor John Hickenlooper expressing support for the addition of the BKMD to the NPL. In his letter, Governor Hickenlooper noted that the Town of Silverton, San Juan County, Durango, La Plata County, local tribes and other interested stakeholders requested that BKMD be added to the NPL. The decision to propose the site to the NPL came after extensive reengagement with local communities, local, state and tribal government officials and other key stakeholders and represents EPA's long-term commitment to further investigate and to carry out remediation for the area. The comment period for the proposed listing ended June 13, 2016, and EPA will respond to comments received prior to making a final decision. Additional site characterization would then be necessary prior to considering cleanup options and associated costs.

In the meantime, EPA is taking action to further stabilize the Gold King Mine adit by installing steel bracing and concrete and to stabilize the mine waste pile located in front of the adit. The consultation process for this work included EPA Headquarters and DRMS review of site-specific work plans, a technical assessment of the potential for a fluid release, and verification of a carefully designed and coordinated contingency plan. Acid mine drainage will continue to be piped from the adit to the Interim Waste Treatment Plant through November 2016. Given the continuing historical discharges in this area, EPA is initiating an evaluation of the options available in the longer term to continue operating the water treatment plant.

Using Clean Water Act Tools in Downstream Areas not Presently Proposed for Designation on the NPL

Under the federal Clean Water Act (CWA), EPA provides grant assistance to help support state and tribal water quality management programs. States and authorized tribes set water quality standards to help prevent pollution of their waters. Every two years, states are required to consider readily available data and information to assess their waters and prepare lists of waters that do not meet their water quality standards and need a cleanup plan. To implement cleanup plans, states include appropriate limits in CWA discharge permits for point sources and use federal grants and state authorities and grant programs to reduce nonpoint sources of pollution.

In 2018, the states of Colorado, New Mexico and Utah will prepare their next lists of waters that do not meet standards and need a TMDL. The states will consider all readily available information, including monitoring data that has been collected since the Gold King Mine release. They will then decide which portions of their waters do not meet their standards and need to be listed. EPA will work with the states and tribes who share the Animas and San Juan Rivers to help them consider multi-jurisdictional issues, such as differences in state and tribal water quality standards and collaboration to address pollution that crosses state and tribal borders, including pollution from nonpoint sources that are not regulated under the federal CWA.

CONCLUSION

EPA recognizes the impacts that the Gold King Mine release has had on communities and residents who live along and use the Animas and San Juan Rivers. We continue to be accountable, and working with our federal, state and tribal partners, we are implementing and sharing best practices and lessons learned from this event to ensure that those affected by the legacy of abandoned mines can benefit from our work. Countless communities and their residents throughout the country are dealing with the legacy of abandoned and inactive mines. The public should not have to bear the costs of cleaning up the contamination. We will continue to pursue parties responsible for creating these conditions and support the Obama Administration's request for an Abandoned Mine Lands fee to help cover the costs of cleanups at these sites.

EPA's commitment remains strong to work with states, tribes, and local stakeholders to evaluate the effects of the continuing historical mine releases on water quality in the Animas and San Juan watersheds and provide recommendations and support for appropriate follow-up monitoring and actions, including taking action on the proposal for listing of the Bonita Peak Mining District on the NPL. EPA will implement a collaborative response program that serves the public interest and supports a broader, science-based understanding of water quality conditions in the Animas and San Juan River Watersheds. EPA will strengthen relationships with the states, tribes, and local governments in the affected areas in order to continue to protect human health and the environment. One year after the Gold King

Mine incident, EPA and our partners are moving forward together and seeking more permanent solutions to these complex environmental problems.